

**STANDARD  
FOR  
MANAGEMENT OF HIGH ACID-PRODUCING SOILS**

Definition

High acid-producing soils are soils with a pH of 4.0 or less or contain iron sulfide.

Purpose

To prevent or limit exposure area, time, and spreading by equipment or rainfall on- and off-site and to minimize erosion, sedimentation and acid leachate-related damages. High acid-producing soil may be exposed during excavation and land grading activities, or may be introduced in dredged sediment. Soils and sediment containing iron sulfide, characterized by pyrite or marcasite nuggets or greensands, are chemically oxidized when exposed to air, producing sulfuric acid and result in soil pH levels falling to pH 4.0 and lower. Most vegetation is incapable of growth at this pH level. Adjacent land and receiving waters will be negatively impacted by the acid leachate. Calcium-containing materials such as sidewalks, culverts and other structures and some metallic materials are also susceptible to degradation. Agricultural limestone materials applied at rates of 8 tons per acre have resulted in only a temporary buffering effect, and "liming-only" is therefore not considered an acceptable mitigation practice.

Water Quality Enhancement

Protects onsite soils and offsite streams and lakes from sulfuric acid leachate that creates soil pH conditions unsuitable for growth of vegetation.

Where Applicable

This practice is applicable to any high acid-producing soil materials. Such materials have been found in the Coastal Plain areas of Burlington, Camden, Cumberland, Gloucester, Mercer, Middlesex, Monmouth, Ocean, Salem and Somerset Counties.

Planning Criteria

Early recognition and burial, removal or disposal of high acid-producing soils is essential for limiting the amount of acidic material produced.

Review a surface geology map for the proposed site to investigate the presence of geologic formations which commonly contain high acid-producing deposits. The geologic formations are as follows:

Cheesequake	Manasquan	Red Bank, Sandy Hook Member
Englishtown Sand	Marshalltown	Shark River
Hornerstown	Merchantville	Tinton
Kirkwood	Navesink	Wenonah
Magothy	Raritan	Woodbury Clay

Figure 1-1 shows areas where these deposits may be present.

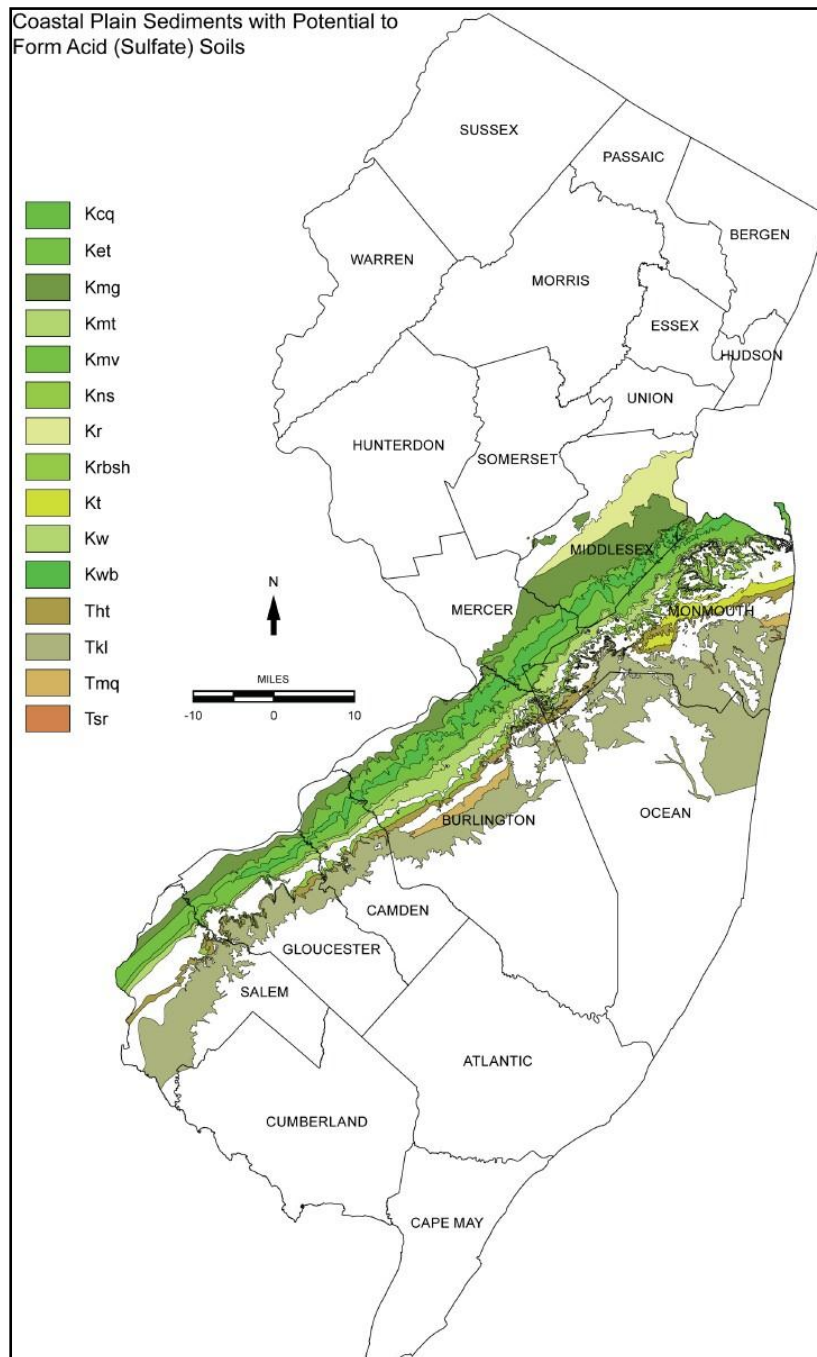
Contact the local Soil Conservation District to determine the historical presence of high acid-producing soils in the vicinity of the proposed development site.

High acid-producing soils may be present in undisturbed soils at varying depths, including near the soil surface to excavations or deep disturbances. Its presence on a site may be significant or limited in the soil profile. High acid-

producing soils are commonly black, dark brown, gray or greenish with silvery pyrite or marcasite nuggets or flakes. Alternatively, sandy soils or reddish, yellowish or light to medium brown soil materials are usually free of high acid-producing deposits.

#### Methods and Materials

1. Limit the excavation area and exposure time when high acid-producing soils are encountered.
2. Topsoil stripped from the site shall be stored separately from temporarily stockpiled high acid-producing soils.
3. Stockpiles of high acid-producing soil should be located on level land to minimize its movement, especially when this material has a high clay content.
4. Temporarily stockpiled high acid-producing soil material to be stored more than 48 hours should be covered with properly anchored, heavy grade sheets of polyethylene where possible. If not possible, stockpiles shall be covered with a minimum of 3 to 6 inches of wood chips to minimize erosion of the stockpile. Silt fence shall be installed at the toe of the slope to contain movement of the stockpiled material. Topsoil shall not be applied to the stockpiles to prevent topsoil contamination with high acid-producing soil.
5. High acid-producing soils with a pH of 4.0 or less or containing iron sulfide (including borrow from cuts or dredged sediment) shall be ultimately placed or buried with limestone applied at the rate of 10 tons per acre (or 450 pounds per 1,000 square feet of surface area) and covered with a minimum of 12 inches of settled soil with a pH of 5.0 or more except as follows:
  - a. Areas where trees or shrubs are to be planted shall be covered with a minimum of 24 inches of soil with a pH of 5 or more.
  - b. Disposal areas shall not be located within 24 inches of any surface of a slope or bank, such as berms, stream banks, ditches, and others, to prevent potential lateral leaching damages.
6. Equipment used for movement of high acid-producing soils should be cleaned at the end of each day to prevent spreading of high acid-producing soil materials to other parts of the site, into streams or stormwater conveyances, and to protect machinery from accelerated rusting.
7. Non-vegetative erosion control practices (stone tracking pads, strategically placed limestone check dam, sediment barrier, wood chips) should be installed to limit the movement of high acid-producing soils from, around, or off the site.
8. Following burial or removal of high acid-producing soil, topsoiling and seeding of the site (see Temporary Vegetative Cover for Soil Stabilization, Permanent Vegetative Cover for Soil Stabilization, and Topsoiling), **monitoring must continue for a minimum of 6 months** to ensure there is adequate stabilization and that no high acid-producing soil problems emerge. If problems still exist, the affected area must be treated as indicated above to correct the problem.

**Figure 1-1. NJ sedimentary units with potential to produce acid:**

Tkl=Kirkwood, Tsr=Shark River, Tmq=Manasquan, Tht=Hornerstown, Kt=Tinton, Krbsh=Sandy Hook Member of the Red Bank, Kns=Navesink, K2=Wenonah, Kmt=Marshalltown, Ket=Englishtown, Kwb=Woodbury, Kmv=Merchantville, Kcq=Cheesequake, Kmg=Magothy, and Kr=Raritan Formations. Credit: NJ Geological Survey, <http://www.state.nj.us/dep/njgs/geodata/dgs09-2.htm>